SWITCHES WITH REDUCED NOISE FOR ELECTRONIC DEVICES

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims the benefit of U.S. Provisional Application No. 62/222,170, entitled "MULTIPLE FUNCTION SWITCH WITH MECHANICAL FEEDBACK" filed Sep. 22, 2015, which is incorporated by reference herein in its entirety.

FIELD

[0002] The described embodiments relate generally to switches. More particularly, the embodiments relate to switches that can include features for minimizing noise and forces generated by operation of components within the switch.

BACKGROUND

[0003] Electronic devices incorporate a variety of electrical components that can each provide different functions. A user's experience with an electronic device is one critical aspect of the operation and desirability of the electronic device. Noise generated by mechanical operation of components such as switches can detract from the user experience. For example, in some occasions noise from switches can lead to annoyance in using the electronic device in quiet environments. It is therefore desirable to reduce noise generated by components of the device where possible.

SUMMARY

[0004] Some embodiments can include a dome switch assembly including a base plate that carries a first contact, and a flexible surface connected to the base plate, the flexible surface formed of a metal material in the shape of a dome. The assembly can include a second contact coupled to the flexible surface, and a sound-dampening pad coupled to the flexible surface and formed of a material having noise-dampening properties, wherein when at least a threshold amount pressure is applied to the flexible surface, the flexible surface changes from the dome shape to a collapsed shape allowing the first and second contact to touch, wherein the sound dampening pad absorbs at least some acoustic energy emitted by the touching of the first and second contacts.

[0005] Some embodiments can include a computing device having a processor, a housing configured to carry the processor, and a dome switch in communication with the processor. The dome switch can include a flexible surface coupled to a switch base, the flexible surface having a dome shape and configured to change to a collapsed shape under a force of pressure, a first contact coupled to the flexible surface and configured to strike a second contact arranged opposite the first contact when the flexible surface changes to the collapsed shape to complete a circuit, and a noise-dampening pad coupled to the flexible surface and configured to absorb acoustical energy released when the first contact strikes the second contact.

[0006] Some embodiments can include a method for assembling a dome switch including, arranging a first contact carried by a collapsible metal dome opposite a second contact, the collapsible metal dome being configured to collapse under an applied force allowing the first and second contacts to touch, electrically coupling the first contact and second contact to a process such that when the contacts touch a circuit is completed and a signal is sent to the processor, and coupling a sound dampening pad to the flexible dome, the sound dampening pad being formed of a material having sound-dampening characteristics and configured to absorb acoustical energy released when the first contact touches the second contact due to the collapsing of the metal dome under an applied pressure.

[0007] Other aspects and advantages of the invention will become apparent from the following detailed description taken in conjunction with the accompanying drawings which illustrate, by way of example, the principles of the described embodiments.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] The disclosure will be readily understood by the following detailed description in conjunction with the accompanying drawings, wherein like reference numerals designate like structural elements.

[0009] FIG. **1**A illustrates an exemplary computing device using the switch of the present invention in accordance with the various embodiments.

[0010] FIG. **1**B illustrates one type of conventional switch often used in computing devices.

[0011] FIG. **2**A illustrates one embodiment of a switch in accordance with the present invention in a resting state.

[0012] FIG. **2**B illustrates the switch of FIG. **2**A in a depressed state.

[0013] FIG. **3** illustrates a feedback profile of a switch in accordance with the described embodiments.

[0014] FIG. **4**A illustrates an exemplary laptop including switches of the describe embodiments.

[0015] FIG. **4**B illustrates an exemplary remote control including switches of the describe embodiments.

[0016] FIG. **5** illustrates an exemplary desktop computer including switches of the describe embodiments.

[0017] FIG. **6** illustrates block diagram of a computing device that can include a switch of the describe embodiments.

[0018] FIG. **7** illustrates a block diagram of a method for assembling switches of the described embodiments.

[0019] Those skilled in the art will appreciate and understand that, according to common practice, various features of the drawings discussed below are not necessarily drawn to scale, and that dimensions of various features and elements of the drawings may be expanded or reduced to more clearly illustrate the embodiments of the present invention described herein.

DETAILED DESCRIPTION

[0020] In the following detailed description, references are made to the accompanying drawings, which form a part of the description and in which are shown, by way of illustration, specific embodiments in accordance with the described embodiments. Although these embodiments are described in sufficient detail to enable one skilled in the art to practice the described embodiments, it is understood that these examples are not limiting such that other embodiments may be used, and changes may be made without departing from the spirit and scope of the described embodiments.

[0021] Many computing devices have been designed to be more compact while also increasing functionality of the